

SECTION 7

7. Fabricating flexible hose assemblies. After the examination of the hose and fitting components in accordance with section 6, the components shall be assembled into flexible hose assemblies for shipboard use.

7.1 Manufacturer's assembly instructions. Maximum use shall be made of the hose fitting manufacturers' instructions, either supplied with the fittings or included in manufacturers' catalogs.

7.2 Navy training film. The Navy training film 02527DN, entitled "The Assembly and Installation of Flexible Hose Configurations" should be viewed by all personnel whose duties include working on flexible hose assemblies.

7.3 General hose assembly, guidance and precautions. The following general guidance and precautions are intended to supplement the guidance provided by the manufacturers' assembly instructions and the Navy training film.

7.3.1 Measurement of hose length. The best way to determine the actual hose length for new hose installations is to template the actual shipboard conditions. From the template, measure the overall dimension of the hose assembly. For a dogleg configuration, this involves two measurements from the intersecting centerlines of the elbow to the end of the hose assembly or template. Subtract the appropriate take out dimensions supplied by the manufacturer. This will give the actual length of the hose required. See figure 7-1 for examples showing free hose length and takeout dimension locations and an example of a template. Ship drawings and selected record drawings should be checked to determine if the hose assembly lengths are given on the drawings. If they are, they should be used.

7.3.1.1 Replacement hose assembly. A replacement hose assembly may be disassembled and hose measurements taken from the removed hose. It should be ascertained that the hose assembly is being replaced because of age or physical damage and not because of a length problem. If the replacement is because of a length problem, use the template method in 7.3.1 above.

7.3.2 Cutting the hose. Mark off the required length of hose along a new section of hose. Cut the hose with a high speed tool steel abrasive cut-off wheel designed for cutting hose. Make sure there is adequate ventilation to rapidly remove the fumes generated by the cutting process. Water mist should be applied to the wheel during the cutting operation to prevent distortion of the cutting wheel. Hose shall be cut square, and care shall be taken regarding the manner and speed with which the hose is fed to the cutting edge of the wheel. To prevent binding, the hose shall be bent slightly so that the outside of the bend contacts the wheel. Excessive feed of the hose to the cutting edge may loosen inner liner or cause partial unravelling of the wire reinforcement. After cutting, clean all residue from the inside and outside of the hose. If cutting the hose has caused the end to neck down slightly, it shall be flared to allow proper insertion of the nipple. A tapered plug should be used to round out the hose I.D. **NOTE:** A wetted sharp knife may be used to cut synthetic fiber reinforced rubber hose.

**NOTE:** When cutting hose from a length of hose that has been in storage for more than 3 months, cut off 1 to 1-1/2 inches from the end before measuring for the desired length. This will remove any hose that may have been damaged in storage.

7.3.2.1 Hose cut-off wheels. There are several types of rotary knife wheels, or blades, and abrasive wheels used to cut hose. Any of the following types may be used subject to the limitations noted.

- a. **Rotary knife.** A good versatile blade for all types of hoses. Produces fewer contaminants than abrasive blades. Must be frequently resharpened.
- b. **Scalloped blade.** Especially good for spiral hoses. However, must be returned to manufacturer for resharpening. Higher initial cost with attendant sharpening costs.
- c. **Carbide blade.** Very good for cutting spiral hoses and not so good on braided hoses. Creates excessive smoke because of nature of cutting. Cannot be reconditioned when carbide has worn off.
- d. **Diamond blade.** Similar to carbide, but lasts twice as long. Much more expensive than carbide and must have continual supply of coolant.
- e. **Aluminum oxide blade** Least expensive blade. Suitable for rubber and PTFE hose. Should be used only on a hose cutoff machine; not in hand held circular saw. Provide suitable ventilation and/or approved breathing apparatus to avoid breathing smoke and particulate matter.
- f. **Shear blade.** An inexpensive guillotine-like device for cutting non-metallic reinforced hose. Not too effective for hoses with exposed fiber braid cover.

**CAUTION:** When cutting hoses with high speed cut-off wheels, it is urged that operators wear protective clothing and approved breathing apparatus since the procedure will produce smoke and particulate matter.

7.3.3 Skiving. Skive off the rubber cover of the hoses if skiving is required by the manufacturers' instructions. Skiving is generally required for multiple layer wire reinforced hoses. Take care not to cut or otherwise damage the reinforcing wires when skiving. End fittings for hoses that must be skived contain a notch which is used to measure the length of hose to be skived.

7.3.4 End sealant for wire reinforced hoses. Apply end sealant to cut ends of hoses and over any reinforcing wires exposed by skiving. Allow to set for approximately one-half hour then apply a second coat of sealant and immediately attach the end fitting or dogleg fitting to the hose. An approved end sealant is Dynatron/Bondo 902 (AQ P/N 222006A) or equal. This end sealant shall be used full strength for all applications.

**CAUTION:** Do not put sealant on I. D. of hose. Sealant is highly flammable. Ensure sufficient ventilation and no open flames or smoking in area. Use chemical goggles or face shields and solvent resistant gloves, such as nitrile rubber.

#### 7.4 Special assembly guidance

7.4.1 Internal support devices. Flexible hose assemblies that can be subjected to vacuum conditions frequently require an internal support device to prevent liner separation or hose collapse. When required by table 5-1 internal support devices shall be installed. For hose sizes smaller than -64 (4 inches) the internal support device is a coil made of a flat strip of beryllium copper. For hoses -64 and larger the internal support device is a molded rubber insert.

- a. When the internal coil device is used it shall be installed with a gap at one end so that it will not contact both end fittings at the same time. The coil shall not be shorter than 1/2 inch less than the internal length of the hose. Follow the manufacturers' instructions carefully when installing the coil device.
- b. The support cylinders shall be installed in accordance with the manufacturers' instructions. NSNs for the support cylinders are shown in Table 7-1.

Table 7-1, Support cylinder NSNs

SIZE (DASH No.)	NSN
-64	4720-01-223-3692
-80	4730-01-144-7579
-96	4720-00-929-1105
-128	4720-00-204-9569
-160	4720-01-206-3605
-192	4720-01-386-6115

**NOTE:** PTFE hose assemblies using non-reusable end fittings in steam drain applications utilize a flat ribbon internal coil to prevent collapse of the hose. These coils are welded in place on both ends and are non-removable. Internal support coils used with PTFE hose assemblies utilizing reusable end fittings have collars on the ends of the coil.

#### 7.4.2 Free length of hose

7.4.2.1 Minimum free hose length. The minimum free hose length for any hose assembly shall be such that the hose will not be bent to less than its minimum bend radius under maximum shock excursions. Subject to the above, the absolute minimum free hose length for new hose assembly installations shall be nine inches for sizes -4 through -64, and 24 inches for hoses larger than -64 size.

**NOTE:** Some older ships may not exhibit a full 9 inches of free length because the original criteria for free length measurement included a portion of the segmented hose fitting. Direct replacements are authorized for such installations.

**NOTE:** For new ship design, the minimum free hose length for each hose assembly shall be determined by the Design Yard to meet deflection and/or acoustic requirements.

SECTION 88. Examination and test of complete hose assembly

8.1 Examination. Upon completion of the fabrication of a hose assembly, the entire hose assembly configuration shall be visually examined as follows:

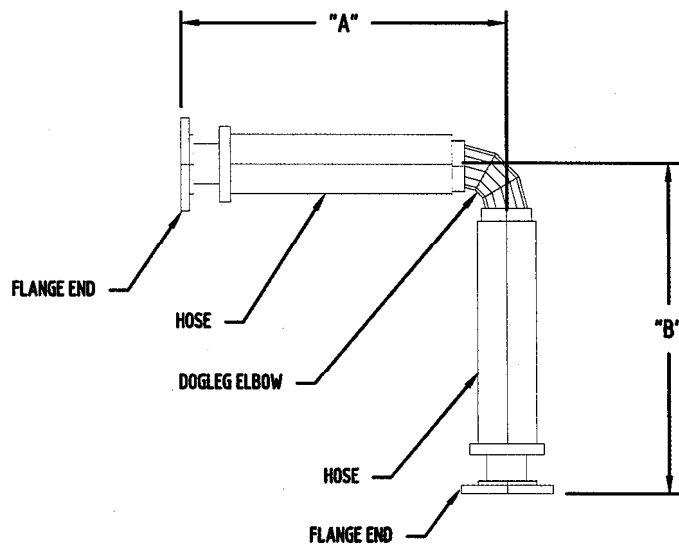
- a. Ensure that the tube and cover are intact and contain no cuts, cracks or abrasions beyond that permitted in 6.1.e.
- b. Where segmented socket fittings are used, ensure that the hose butts against the nipple shoulder.
- c. Ensure that the retaining ring and band, when used, are properly set and tight.
- d. Ensure that bolts and nuts, where used, are tight and that segments are evenly spaced. Ensure torque requirements of the manufacturer have been followed.
- e. Ensure that hose has not been twisted during fabrication of hose assembly.
- f. Ensure that a bead of end sealant has been applied where the hose comes out of the fitting when solid socket fittings are used. (See 7.3.5.4 for sealant restrictions).
- g. If the application requires the use of an internal support device, make sure that the support device is a flat ribbon strip coil for hose sizes smaller than -64, and a bonded ring support cylinder insert for sizes equal to and larger than -64. Where a coil device is used, it shall not touch both end fittings at the same time and shall not be shorter than 1/2 inch less than the internal length of hose.
- h. Ensure that hose has not bunched or blistered on I.D. at nipple edge.
- i. Ensure that hose fitting threads have not been damaged during hose assembly fabrication.

8.2 Hydrostatic test. After completion of the visual examination, the hose assembly shall be hydrostatically tested as follows:

- a. Draw a circumferential chalk line around the hose next to each fitting attachment. Measure distance from the lines to fitting edges at four places 90° apart.
- b. Attach test fitting or adapter. Flanged hose fittings should have strong backs installed to prevent distortion of the flange when the hose assembly is subjected to proof pressure if the hose design pressure exceeds the fitting rated pressure.
- c. Using fresh water or other appropriate liquid (hose assembled for water systems shall be tested with only fresh water), apply a hydrostatic proof pressure equivalent to twice the rated hose working pressure (see Table 5-1). Hold this pressure for 1 to 5 minutes. Hose shall not burst, leak or show signs of fitting separation.

DDG-51 LUBE OIL SYSTEM  
FLEXIBLE HOSE ASSEMBLIES

HOSE NUMBER	SIZE	TYPE	HOSE	FLANGE ASSEMBLY	ELBOW ASSEMBLY	"A" DIM.	"B" DIM.	REMARKS
0001 LOHA003	8"	DOGLEG	AEROQUIP 2580-128	AEROQUIP FC7781-0808-189	AEROQUIP FC7754-0808-188	33.5"	53"	ATTACHED PUMP DISCH
0002 LOHA005	6"	DOGLEG	AEROQUIP 2580-96	AEROQUIP FC7781-9696-189	AEROQUIP FC7754-9696-188	46"	49"	PMP 2B DISCH
0003 LOHA006	6"	DOGLEG	AEROQUIP 2580-96	AEROQUIP FC7781-9696-189	AEROQUIP FC7754-9696-188	46"	46"	PMP 2A DISCH
0004 LOHA007	6"	DOGLEG	AEROQUIP 2580-96	AEROQUIP FC7781-9696-189	AEROQUIP FC7754-9696-188	40.5"	44"	SPLY HDR



HOSE ASSEMBLY DETAIL

SK-007  
DDG-51 LUBE OIL HOSES  
5-19-04